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Classical Derivation of Fermion Operators and Correlations

ROBERT CLOSE, None — A second-order wave equation is derived for an ideal elastic solid. The Klein-Gordon equation is a special case of this equation in which the mass term replaces the nonlinear rotation and convection terms. The second-order wave equation is factored to yield a first order bispinor equation. This equation is similar to the Dirac equation. The corresponding Lagrangian is constructed in terms of bispinors. The quantity conjugate to angular velocity is the quantum mechanical angular momentum. The quantity conjugate to velocity includes the quantum mechanical wave momentum and also the momentum of the medium. Along a given axis there are two independent solutions corresponding to forward- and backward-propagating waves. Since these independent states are separated by 180 degrees, their bispinor wave functions transform under rotation with spin one-half. Potentials are derived from consideration of wave interference. Parity is conserved. The conventional Dirac parity operator is incorrect because it represents a 180 degree rotation rather than inversion of velocity space. Correlations between classical bispinor wave functions are identical to the quantum correlations.

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